Module Specification

Electro-mechanical Systems

Version: 2024-25, v3.0, 21 Jun 2024

Contents

Part 1: Information

Module title: Electro-mechanical Systems

Module code: UFME76-15-2

Level: Level 5

For implementation from: 2024-25

UWE credit rating: 15

ECTS credit rating: 7.5

College: College of Arts, Technology and Environment

School: CATE School of Engineering

Partner institutions: University Centre Weston

Field: Engineering, Design and Mathematics

Module type: Module

Pre-requisites: None

Excluded combinations: None

Co-requisites: None

Continuing professional development: No

Professional, statutory or regulatory body requirements: None

Part 2: Description

Overview: Aim of this module is to enable student to appreciate Electromechanical Systems as a design philosophy with the objective of optimal integration of Mechanical, Electronics and Software Engineering to produce superior products, processes and systems.

Features: Not applicable

Educational aims: Integrating theory and practice, the module will provide the knowledge and experience required, for the appreciation of Electromechanical Systems as a design philosophy.

Outline syllabus: The syllabus may include but not be limited to the following:

MECHANICAL ELEMENTS: Acceleration, Velocity, Torque, Inertia; Mechanical transmission; Gearboxes, pulley, belt and chains; Linear and Rotary bearings; Machine screws and Splined shafts.

SENSORS and SENSOR CHARACTERISTICS: Linearity, repeatability, resolution etc. for a range of sensors and principle of operation of various sensors.

SYSTEMS INTEGRATION: Rotary and linear electric motors, gearboxes and shafts integration.

SYSTEMS MODELLING and CONTROL: Open, close loop control; Novel controllers; System performance measures; Controllers PC and PLC and Embedded; Software for control, Languages and Platforms.

Examples of mechatronic systems may include: Robots, Machine tools; Car Engine management system etc.

The syllabus will also examine areas related to the engineering design activity, user requirements, design specification, concept design and selection, product life cycle management, sustainability, design of integrated electromechanical systems and software interfacing, introduction to design optimisation.

Part 3: Teaching and learning methods

Teaching and learning methods: Content will be delivered in whole cohort sessions supported by on-line resources.

The majority of the learning activity will take place in group-based workshops, working on the electromechanical system design tasks.

Independent learning includes hours engaged with essential reading and assignment preparation.

Module Learning outcomes: On successful completion of this module students will achieve the following learning outcomes.

MO1 Apply quantitative methods and computer software to identify and create mathematical and computer aided models, for simple electromechanical systems.

MO2 Demonstrate the ability to use selection criteria for sensors, actuators, mechanical and control elements, and formulate test procedures for the efficient performance of electromechanical systems.

MO3 Investigate electromechanical systems and identify environmental constrains, sustainability limitations, health and safety and risk assessment issues.

MO4 Propose a complete mechatronics solution for a simple electromechanical system.

Hours to be allocated: 150

Contact hours:

Independent study/self-guided study = 114 hours

Face-to-face learning = 36 hours

Reading list: The reading list for this module can be accessed at readinglists.uwe.ac.uk via the following link https://uwe.rl.talis.com/modules/ufmfr9-15-2.html

Part 4: Assessment

Assessment strategy: Students will work in groups on design activities that will lead to the solution to an electromechanical system design problem.

Students will submit an individual report of 2000 words and supportive documentation such as CAD drawings, calculations and bill of materials.

Assessment tasks:

Report (First Sit)
Description: Individual report (2000 words) + supportive documentation
Weighting: 100 %
Final assessment: Yes
Group work: No
Learning outcomes tested: MO1, MO2, MO3, MO4

Report (Resit)
Description: Individual report (2000 words) + supportive documentation
Weighting: 100 %
Final assessment: Yes
Group work: No
Learning outcomes tested: MO1, MO2, MO3, MO4

Part 5: Contributes towards

This module contributes towards the following programmes of study:

Electro-mechanical Engineering {Apprenticeship-UCW}[UCW] BEng (Hons) 2023-24